

Patent claims

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1. An apparatus for determining and/or monitoring the filling level of a product or the position of the interface between two media or phases in a container, with a signal-generating unit, which generates high-frequency measuring signals, a coupling-in unit and a waveguide, the measuring signals being coupled in onto the waveguide via the coupling-in unit and conducted in the direction of the product via the waveguide, and with a receiving/evaluating unit which determines the filling level of the product or the position of the interface in the container directly or indirectly via the delay time of the measuring signals reflected at the surface or interface of the product, wherein the waveguide (5) is a wire cable which comprises a plurality of individual wires (10) of a predetermined diameter (D) which are twisted together.
 2. The apparatus as claimed in claim 1, wherein the waveguide (5) comprises a plurality of coaxial layers (11, 12, 13), the individual wires (10) in the individual layers (11, 12, 13) being twisted in the same direction.
 3. The apparatus as claimed in claim 1 or 2, wherein the waveguide comprises 19 individual wires and is made up of three layers (11, 12, 13).
 4. The apparatus as claimed in claim 1, 2 or 3, wherein the twisting of the individual wires (10) in the individual layers (12, 13) is in opposite directions.
 5. An apparatus for determining and/or monitoring the filling level of a product or the position of the

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interface between two media or phases in a container, with a signal-generating unit, which generates high-frequency measuring signals, a coupling-in unit and a waveguide, the measuring signals being coupled in onto the waveguide via the coupling-in unit and conducted in the direction of the product via the waveguide, and with a receiving/evaluating unit, which determines the filling level of the product or the position of the interface in the container directly or indirectly via the delay time of the measuring signals reflected at the surface or interface of the product, wherein the waveguide (5) comprises a plurality of pieces (14) which are connected to one another via in each case at least one flexible intermediate piece (15).

6. The apparatus as claimed in claim 5, wherein the pieces (14) are tubes or rods.

7. The apparatus as claimed in claim 5 or 6, wherein the flexible intermediate piece (15) is a wire cable or a universal joint.

8. The apparatus as claimed in claim 6 or 7, wherein the connection (16) between the piece (14) and the flexible intermediate piece (15) is a crimped connection.

9. The apparatus as claimed in claim 7 or 8, wherein the flexible connection (15) is enclosed by a tubular mesh (17), the mesh (17) terminating essentially flush with the surface of the pieces (14).

10. An apparatus for determining and/or monitoring the filling level of a product or the position of the interface between two media or phases in a

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container, with a signal-generating unit, which generates high-frequency measuring signals, a coupling-in unit and a waveguide, the measuring signals being coupled in onto the waveguide via the coupling-in unit and conducted in the direction of the product via the waveguide, and with a receiving/evaluating unit, which determines the filling level of the product or the position of the interface in the container directly or indirectly via the delay time of the measuring signals reflected at the surface or interface of the product, wherein the waveguide (5) is a flexible element, for example a wire cable, which is surrounded on its surface by a metal mesh.

11. The apparatus as claimed in one or more of the preceding claims, wherein a defect which serves as a reference for the linear measurement is provided in at least one predetermined region of the waveguide (5).

12. The apparatus as claimed in claim 11, wherein the at least one defect is defined by a change in the geometry of the waveguide (5).

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